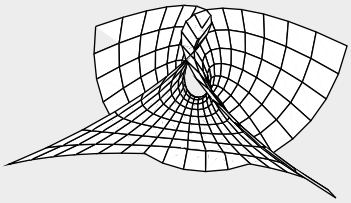

Oberseminar Mathematische Strömungsmechanik

Institut für Mathematik der Julius-Maximilians-Universität Würzburg

Hyperbolic equations - structure preserving methods & other topics

Cory D. Hauck

Oak Ridge National Laboratory, USA

Discontinuous Galerkin Methods and the Diffusion Limit

Abstract:

Discontinuous Galerkin (DG) methods were first constructed for the purpose of solving kinetic transport equations. Since then, it has been realized that DG methods perform well in scattering-dominated regimes, where the solution of the transport equation can be approximated asymptotically by the solution of a much simpler diffusion equation. For this reason, DG methods continue to be popular in applications where the diffusion limit is important. The effectiveness of DG in this limit can be traced back to the additional degrees of freedom per cell it uses (when compared to finite volume methods). However, these extra degrees of freedom come at a substantial cost, especially given the fact that memory is often the limiting factor when simulating realistic problems with a kinetic description. In this talk, I will review some of the history of DG methods and their use in radiation transport simulations. I will then present two methods for reducing the memory of the standard DG approach while still capturing the asymptotic diffusion limit. Both methods rely on a hybrid approach to solving the transport equation.

via Zoom video conference (request the Zoom link from klingen@mathematik.uni-wuerzburg.de)

Friday, Feb.. 5 at 3 pm GMT+1

Zu diesem Vortrag sind Sie herzlich eingeladen.

gez. Christian Klingenberg